

the size of their phones.⁸³ Industry analysts increasingly express skepticism that Americans will adopt many of the European and Japanese “innovations” of apparently limited utility.⁸⁴ Says one analyst, “the reality is that people aren’t finding the services interesting.”⁸⁵

Today, most Americans have *access* to high-speed wireline Internet services. The Commission noted that 91 percent of the U.S. population lives in zip codes that have at least one subscriber to high-speed services.⁸⁶ Yet only a tiny fraction of them have chosen to subscribe: residential penetration lags at far less than one percent.⁸⁷ It seems doubtful whether Americans who have by and large eschewed high-speed *wireline* access will want and be willing to pay for high-speed *wireless* access.

Nor is it clear that wide-area wireless networks will be the wireless data providers of choice. Alternative technologies are being developed and in some cases implemented even today. By way of example, Mark Kelley discusses the IEEE 802.11 technology that is now available and in limited use. 802.11 delivers wireless access to a Local Area Network (LAN), at data rates of 11 Mbps.⁸⁸ *Eleven megabits per second*. This is as fast as DSL. But as Kelley

⁸³ See, e.g., Peter Goodman, “Where’s the Wireless Web?”, The Washington Post (March 30, 2001) Page E1 (“A growing chorus within the industry now argues that . . . cramming the present-day Internet onto tiny screens is a pointless exercise”).

⁸⁴ See, e.g., Simon Romero, “U.S. May Be Lagging Behind in Wireless, and That May Be Just As Well,” The New York Times (Jan 29, 2001) Page 1 (“In Britain, the user of a mobile phone can book restaurant reservations by laboriously linking to a Web site by typing on the phone’s keypad (even though it would probably be faster to call the restaurant)”).

⁸⁵ Goodman, “Where’s the Wireless Web?” at E1.

⁸⁶ See Public Notice, FCC Issues Report on the Availability of High-Speed and Advanced Telecommunications Services (rel. Aug. 3, 2000). The Commission defines “high-speed” services as infrastructure capable of delivering at least 200 Kbps.

⁸⁷ *Id.*

⁸⁸ Kelley Dec. ¶ 59.

makes clear, the point is not that 802.11 will be wireless data model of the future.⁸⁹ Rather, the point is that no one knows what form (or what spectrum) wireless data will take.

The most successful data service in the world, DoCoMo's I-Mode, provides full Internet access in Tokyo, one of the most densely populated cities in the world, using only 15 MHz of spectrum.⁹⁰ And it provides a data rate of only 9,600 bits per second. This compares with a data rate of approximately 4,000 bits per second on a standard digital wireless phone call. I-Mode users (as do all data users) typically download only for brief periods of time, so that the 9.6 Kbps data transfers seldom last more than a few seconds at a time. Yet even were an I-mode user to download continuously for some period of time, he would use bandwidth only slightly more than would be required for two simultaneous phone calls.⁹¹ Wireless data will not lead to a spike in demand for capacity.

B. Increased Efficiency Will Largely Offset Any Increased Demand for Bandwidth

When and if carriers upgrade to third-generation network equipment, they will realize dramatic gains in spectral efficiency. The exact capabilities of most third-generation systems remain closely guarded secrets, but experience dictates that there will be significant incremental improvements in efficiency over the previous generation. By way of comparison, the third generation CDMA technology (CDMA 2000 1X) that will be commercially available in late 2001 will allow 116 Erlangs per 10 MHz.⁹² This represents approximately a quantum leap

⁸⁹ Kelley Dec. ¶¶ 56-69.

⁹⁰ Kelley Dec. ¶ 43. DoCoMo holds other spectrum, of which some is used for voice, and much is reserved for later development. *Id.*

⁹¹ *Id.*

⁹² Kelley Dec. ¶ 25.

over the capacity of the most advanced CDMA technology currently available, and almost four times the capacity of mid-1990s CDMA technology.⁹³

Mark Kelley states that one can reasonably assume that the next-generation network technologies for TDMA and GSM systems will (like the CDMA technology) at least double their existing capacity.⁹⁴ And because the WCDMA technology to which GSM is expected to migrate for its “third generation” is code division technology, rather than frequency or time division, it will probably offer capacity improvements far greater than double the current capacity of GSM or TDMA.⁹⁵

Likewise, other improvements in technology will offer significant increases in system capacity when they are implemented. For example, the next generation of vocoders is now available, and offers a 50 percent increase over the capacity of the previous generation.⁹⁶

Thus, efficiencies in voice will allow the introduction of data. Even if carriers need double or triple their overall system capacity in order to accommodate their 3G data offerings, that capacity will be available to them with no increase in their spectrum usage: The very equipment with which they roll out those data offerings will offer double or triple their system capacity, using the same amount of spectrum. 3G will not require additional spectrum.

C. There Is No Reason the Dominant Voice Carriers Should Also Dominate “3G”

Even if one believes that the public will demand high-speed data services, *and* that those services will require substantially more network capacity, *and* that these capacity

⁹³ *Id.*

⁹⁴ Kelley Dec. ¶ 48.

⁹⁵ *See* Kelley Dec. *Id.*

⁹⁶ Kelley Dec. ¶ 52. A vocoder is the chip in a telephone that digitizes a person’s voice.

requirements will not be offset by capacity gains derived through the same equipment upgrades that led to the demands, that *still* does not prove that existing carriers should be the ones who are granted the right to provide those high-speed data services rather than innovative, entrepreneurial competitors.

True high-speed data services are likely to be perceived by consumers as distinct from voice telephony. Consumers prefer their telephones to be of a size and shape that does not permit anything but the most primitive screens or data entry devices.⁹⁷ As likely as not, telephones will continue to look and act more or less like telephones, perhaps with the addition of text-based services. Data-intensive applications will likely be performed on separate devices: laptop computers and personal digital assistants, such as Palm Pilots or Blackberries.⁹⁸ From the consumer's perspective, there is little reason that incumbent wireless telephony providers should also be the ones who provide wireless data.

Similarly, from a technical perspective, there are relatively few efficiencies to be realized from the combination of wireless voice and data. As Mark Kelley states, “[v]oice-based networks have been designed virtually from end-to-end to optimize that single application.”⁹⁹ Yet packet-based data traffic places significantly different demands on a network than does circuit-switched voice traffic. While voice networks can accommodate data traffic, they are not particularly efficient at it: Kelley states that mixing data and voice on the same network is a bit

⁹⁷ See, e.g., Simon Romero, “U.S. May Be Lagging Behind in Wireless, and That May Be Just As Well,” *New York Times* (Jan 29, 2001) Page 1 (quoting industry participant: “I’m addicted to my cell phone. But I couldn’t imagine a visually appealing way to surf the Web on screens that are so small”).

⁹⁸ Kelley Dec. ¶ 37. See also Romero, “U.S. May Be Lagging Behind,” at 1 (industry is “developing services and devices for the mobile Internet that focus on hand-held computers instead of cell phones”).

⁹⁹ Kelley Dec. ¶ 54.

like mixing motorcycles and 18-wheelers on the same freeway.¹⁰⁰ And because expensive circuit switches are unnecessary for data, the carriage of data over voice networks is in some ways a misallocation of capital resources.¹⁰¹

Even if additional spectrum is necessary to accommodate 3G, that spectrum need not be used by the incumbent voice carriers. There is no real reason that they should be the ones who implement 3G, as opposed to a start-up. *At most*, arguments that spectrum is needed for wireless data prove that *someone* needs additional spectrum. They do not prove that incumbent voice carriers need it. “3G” is no reason to lift the spectrum cap.¹⁰²

V. SOCIETY BENEFITS WHEN THE CAP FORCES EFFICIENCY

The Commission has recognized that “there may be reduced incentives to implement more efficient technologies in a regulatory environment without spectrum aggregation limits.”¹⁰³ The spectrum cap does tend to force carriers into using more spectrally-efficient technologies, a result that benefits society.

The potential efficiencies to be realized through technology improvements are massive. For example, a GSM carrier with 45 MHz of spectrum could double its system capacity in one of two ways. It could either: (1) double its spectrum holdings (after persuading the FCC to remove the spectrum cap) to 90 MHz, half the total CMRS spectrum available to all operators, or it could (2) disaggregate and sell all but 10 MHz of its spectrum, and switch its

¹⁰⁰ Kelley Dec. ¶ 55.

¹⁰¹ *Id.*

¹⁰² See also, e.g., Dan Meyer, “Sprint Says It Has Ample Spectrum for 3G Services,” *RCR Wireless News* (March 26, 2001) at 34.

¹⁰³ Notice ¶ 32 (citing 1998 Biennial Review at ¶ 62)

system to CDMA. Either way – with a 10 MHz CDMA system or a 90 MHz GSM system – the carrier would have the same network capacity.¹⁰⁴

Plainly, society is better off when the inefficient carrier is forced to become more efficient. Efficiency makes more spectrum available for greater CMRS competition, which should lead to lower prices and better service in the CMRS marketplace. Likewise, when spectrum is conserved and used efficiently, fewer demands are placed on competing (non-CMRS) users. Yet the market does not by itself ensure that society receives these benefits.

As an initial matter, the CMRS marketplace can not account for the potential value of spectrum uses outside CMRS. Because the government declares by fiat whether spectrum should be allocated to CMRS or some other use (such as broadcasting), CMRS providers as a whole are insulated from marketplace signals that their spectrum resources should be used more efficiently or allocated elsewhere.¹⁰⁵ In this regard, the spectrum cap provides an incentive towards efficiency where the market cannot.

Furthermore, as the declaration of Professor Cramton suggests, wireless carriers may in certain cases be perversely incentivized *against* efficiency. Consider the carrier that may increase capacity either by acquiring more spectrum, or by buying better equipment. Again, one would normally expect the market to dictate a rational decision by the carrier: the cost of spectrum should reflect its alternate use, so the carrier should be expected to invest in equipment rather than spectrum if the alternate use (by a new entrant) of the spectrum is valued higher than the cost of the new equipment. However, the incumbent carrier may not do so.

¹⁰⁴ See Kelley Dec. ¶ 23.

¹⁰⁵ Cf. generally, e.g., United States Department of Commerce, *The Potential for Accommodating Third Generation Mobile Systems in the 1710 – 1850 MHz Band: Federal Operations, Relocation Costs, and Operational Impacts* (March, 2001) (estimating costs of relocating government uses).

In addition to considering the cost it must pay for equipment against the cost it must pay for spectrum, the incumbent carrier must take into account the profit it will enjoy from the diminution of competition resulting from its spectrum purchase. Even if the otherwise rational decision would be to purchase equipment, not spectrum, the carrier will purchase spectrum, not equipment, if it can offset the difference with increased profits gained by foreclosing competition. This scenario becomes even more likely where the incumbent carrier has a disproportionate share of the existing market, and thus would realize a disproportionate share of the anticompetitive profits to be made, or when the incumbent carrier may profit in other markets by foreclosing entry in a particularly strategic market.

An analysis of the bidding in the New York BTA during Auction #35 suggests that Verizon may have been motivated by exactly such warehousing considerations. In particular, Verizon's bidding tactics—it remained active on two 10 MHz licenses in the open auction until prices reached \$2.05 billion per license—denied Cingular access to the New York market. Without New York in its portfolio, Cingular will face greater difficulties in selling nationwide plans to customers who demand coverage in New York. Of course Cingular can allow customers to roam in New York, but when they do, Cingular must lease spectrum at rates that could be higher than the per-minute rates paid by its customers. Verizon's gain from acquiring spectrum in New York is larger than its pro-rata gain in the New York market in isolation—that is, Verizon will face less competition in the market for nationwide one-rate plans in *every* geographic market as a result of its actions. Because incumbent carriers are limited in their ability to warehouse spectrum by the spectrum cap, removal of the spectrum cap would only exacerbate this problem.

VI. OTHER MEANS OF ENFORCING COMPETITION ARE INADEQUATE

The Commission has long recognized that its regulations must ensure adequate competition. This duty stems in part from the Communications Act itself, which directs the Commission to promote competition “by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants.”¹⁰⁶ The cap has therefore been recognized as a means to achieving “the goal of diversity of ownership that [the Commission is] mandated to promote under section 309(j) of the Act.”¹⁰⁷ Likewise, the Commission has recognized harm to competition to be within the scope of its section 310(d) review¹⁰⁸ of whether a license transfer would serve the “public interest.” There is no better means than the spectrum cap by which the Commission could achieve its mandate to prevent an excessive concentration of spectrum holdings.

A. A Bright Line Rule is Efficient

Faced with the choice between case-by-case enforcement and a bright line rule, the Commission has recognized that the cap is preferable.

As an initial matter, the cap “provides entities who are making acquisitions with greater assurance than a case-by-case approach that if they fall under the cap, the Commission will approve the acquisition.”¹⁰⁹ The Commission has recognized that certainty is “particularly important” in the current climate of mergers and acquisitions through which many carriers seek

¹⁰⁶ 47 U.S.C. § 309(j)(3)(B).

¹⁰⁷ Amendment of Parts 20 and 24 of the Commission’s Rules – Broadband PCS Competitive Bidding and the Commercial Mobile Radio Service Spectrum Cap, Report and Order, 11 FCC Rcd. 7824, ¶102 (1996).

¹⁰⁸ 47 U.S.C. § 310(d).

¹⁰⁹ Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, *Third Report and Order*, 11 FCC Rcd. 7988, ¶ 248 (1994).

to assemble regional and national footprints.¹¹⁰ Likewise, certainty dramatically improves the ability of carriers to secure third party financing for acquisitions and capital investments.¹¹¹

Using a bright-line cap also eases the Commission's administrative burden. Were the cap abandoned, the resulting individualized case-by-case review of transactions "inevitably would lengthen [the Commission's] review process."¹¹² Leaving aside the interest in conserving the Commission's resources, a lengthened period of application review would harm the parties to all transactions – not just those that posed a competitive issue.¹¹³ And a policy that lengthened and increased the expense of application review would increase the barriers to entry in a market, and would disproportionately harm small businesses, who "do not have the resources of larger incumbents to fight protracted legal battles."¹¹⁴

B. The Spectrum Cap Reaches Anticompetitive Conduct That May Otherwise Escape Regulation

1. FCC Application Review is Not Always Available

The Commission's case-by-case review of transactions under section 310(d) of the Act may be limited to a review of transfers of controlling interests. Without the spectrum cap, then, certain anticompetitive ownership transfers could therefore escape the Commission's review. For example, rather than foreclose competition by the direct acquisition of another licensee, a carrier could acquire a substantial minority equity position in its potential rival, and enter into a "joint venture" arrangement that would effectively prevent true competition from

¹¹⁰ 1998 Biennial Review ¶ 51.

¹¹¹ See *id.*

¹¹² *Id.* ¶ 52.

¹¹³ See *id.*

¹¹⁴ *Id.* ¶ 53. To implement such a policy would violate the Commission's statutory mandate to promote small business ownership of telecommunications companies. See 47 U.S.C. §§ 309(j)(3)(B), 309(j)(4)(D).

arising. The Commission has recognized that “an investor can influence a licensee without a controlling interest.”¹¹⁵ Through its attribution standards, the spectrum cap captures potentially anticompetitive behaviors the Commission might not otherwise reach.

2. DOJ and FTC Antitrust Review is Not Always Available

Nor is Department of Justice or Federal Trade Commission pre-merger review sufficient to guarantee competition in this regard. As an initial matter, some transactions in spectrum holdings would be insufficient to trigger the pre-merger filing requirements of the Hart-Scott-Rodino Act.¹¹⁶ Indeed, the recent increase of the notification threshold from \$15 million to \$50 million ensures that many transactions, particularly those involving bare licenses, will escape antitrust review. Using the winning bids in the FCC’s recent Auction #35 as an example, one finds that out of 422 broadband PCS licenses sold, 350 went for less than the HSR filing threshold, \$50 million.¹¹⁷ In other words, *eighty percent* of the licenses sold in that auction could have escaped DOJ or FTC pre-merger review in a private sale.¹¹⁸

Furthermore, DOJ and FTC have limited enforcement resources, and are unable to give full review to every transaction that may present competitive issues. In 1999, for example, fewer than five percent of all pre-merger notifications receive “second requests” by which the executive agencies conduct a thorough review of proposed transactions.¹¹⁹ And DOJ filed suit in

¹¹⁵ 1998 Biennial Review ¶ 90.

¹¹⁶ 15 U.S.C. § 18(a).

¹¹⁷ Public Notice, C and F Block Broadband PCS Auction Closes, DA 01-211, Attachment A (rel. Jan. 29, 2001).

¹¹⁸ *Id.* Moreover, 280 licenses in Auction #35 (66 percent of the total) were sold for less than \$10 million. *Id.* Thus, *two-thirds* of the licenses sold in Auction #35 could have been combined and sold in blocks of five or more and yet still escaped antitrust review.

¹¹⁹ See Antitrust Division, United States Department of Justice, *10- Year Workload Statistics FY 1990 – 1999*, available at <http://www.usdoj.gov/atr/public/4504.htm> (site accessed April 12, 2001).

less than one-half of one percent of all reportable transactions.¹²⁰ The Antitrust Division stated in its most recent Annual Report: “The analysis of proposed mergers has become increasingly difficult as the products and services of our economy become more complex and the pace of development of new products increases.”¹²¹ The Antitrust Division is not prepared to review every spectrum acquisition to determine whether it is likely to foreclose competition.

Perhaps most importantly, antitrust review is not particularly well suited to application to an emerging market such as wireless telecommunications. The Commission has recognized that “antitrust laws were written primarily to address concerns that threaten to curtail *actual* competition.”¹²² Indeed, it remains unclear even whether the Clayton Act prohibits mergers that will restrict only *potential* competition.¹²³ And as a policy matter, experience shows that DOJ will almost invariably allow mergers to go forward that do not restrict actual competition.¹²⁴

¹²⁰ *Id.*

¹²¹ Antitrust Division, United States Department of Justice, *Annual Report FY 1999*, available at <http://www.usdoj.gov/atr/public/4523.pdf> (site accessed April 12, 2001) at 9.

¹²² 1998 Biennial Review ¶ 57 (emphasis added) (citing Herbert Hovenkamp, *Federal Antitrust Policy* (1994), § 13.4 at 512).

¹²³ See ABA Section of Antitrust Law, *Antitrust Law Developments* (4th ed. 1997) at 342-350. In the case of spectrum acquisitions, the theory would have to be “actual”, rather than “perceived” potential competition, *id.* at 342-43 a theory the validity of which the Supreme Court has twice expressly left open, *id.* at 346 (citing *United States v. Marine Bancorporation*, 418 U.S. 602, 639 (1974); *United States v. Falstaff Brewing*, 410 U.S. 526, 537-38 (1973)).

¹²⁴ See Cramton Dec. ¶ 60. As Dr. Cramton suggests, this conclusion applies equally to the acquisition by incumbent carriers of fledgling licensees who have not truly begun to compete. It is easy to imagine such a scenario: One of the winners in Auction #35 finishes its build out in a market dominated by a few large carriers, right when the FCC lifts the spectrum cap. It is acquired by one of the dominant carriers with DOJ intervention, because the HHIs remain virtually unchanged. And the dominant carriers remain dominant.

VII. HIGHER FOREIGN SPECTRUM LIMITS SHOULD NOT BE IMITATED

The Commission seeks comment on “the lessons to be learned from experience internationally.”¹²⁵ Indeed, opponents of the spectrum cap often state that the United States should follow the purported example of other nations in allowing carriers to obtain significantly more than 45 MHz of spectrum.¹²⁶ Yet they fail to recognize the fundamentally different conditions that exist in those foreign markets. The United States should not imitate these higher foreign spectrum aggregation limits.

The United States has made less spectrum available for CMRS than have most other developed countries. This is a neutral fact, but leads to the fundamental fallacy committed by those who urge the United States to follow the higher levels of spectrum aggregation allowed by those countries: they argue by analogy to situations that are simply not analogous.

The spectrum cap opponents’ own materials demonstrate the fallacy of their argument. Consider CTIA’s famous bar graph, showing Old Glory shamefully and unpatriotically flying at half-mast relative to the Rising Sun and the Union Jack.¹²⁷ It also shows that Japan and the United Kingdom have allocated much more spectrum to CMRS, and that their higher aggregation limits are commensurately higher. The UK is said to have allocated 364.6 MHz of spectrum (approximately double the stated allocation of 189 MHz in the US), and its spectrum cap is said to be 85 MHz (approximately double the cap of 45 MHz in the US).¹²⁸ Indeed, the Commission’s *Notice* recognizes that, “because most European countries have

¹²⁵ *Notice* ¶ 44.

¹²⁶ See, e.g., Tom Wheeler, “Spectrum: The Next Generation of the Information Superhighway,” Presentation to the New America Foundation (Feb. 13 2001).

¹²⁷ *Id.* at 5.

¹²⁸ *Id.*

allocated more spectrum for mobile telecommunications services, they are able to allow individual carriers to acquire larger total spectrum holdings than would be permitted under [the Commission's] spectrum cap policy, while at the same time ensuring that there are at least four, and often more, competitors in their markets.”

The United States has chosen to allocate significant amounts of spectrum to other uses that would be also be usable for mobile telecommunications. Broadcasting, national defense, air traffic control, and other uses occupy more spectrum below 2,500 MHz in the United States than they do in Europe. Leap believes that Congress and the Commission should continue to evaluate and pursue ways to make more spectrum available for CMRS. But unless and until more spectrum is made available, the Commission should not increase the amount of spectrum that any single carrier may acquire.

VIII. CONCLUSION

The CMRS spectrum cap is an important means by which the Commission fosters efficiency and competition. It prevents incumbents from using inefficient network equipment to “squat” on large amounts of spectrum, and thereby to foreclose new entry. Of course, a policy that forces carriers to do anything will never be popular: those who are forced to be efficient would prefer to remain wasteful, and those who are forced to compete vigorously would prefer to remain within closed cartel. But these are not reasons to set aside the public interest. The Commission should retain the spectrum cap.

Respectfully Submitted,

LEAP WIRELESS INTERNATIONAL, INC.

By:

A handwritten signature in black ink, appearing to read 'JH Barker', written over a horizontal line.

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April 13, 2001

**Before the
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

In re

2000 Biennial Regulatory Review)	
Spectrum Aggregation Limits)	WT Docket No. 01-14
for Commercial Mobile Radio Services)	

DECLARATION OF PETER CRAMTON

Qualifications

Introduction

Summary of Conclusions

- I. The Potential Benefits of Maintaining the Spectrum Cap
- A. The Spectrum Cap Facilitates Entry by Innovative Carriers in the Mobile Telephony Market
 - 1. The First Leap Effect: Landline Displacement
 - 2. The Second Leap Effect: Lower Prices in Local Service Plans
 - B. By Facilitating Entry, the Spectrum Cap Instills Price Discipline for Both Nationwide and Local Wireless Services
 - 1. The Price of Nationwide Plans Is Inversely Related to the Number of Distinct Carriers Offering Nationwide Plans
 - 2. The Price of Local Wireless Plans Is Inversely Related to the Number of Distinct Carriers in Each Geographic Market
 - C. The Spectrum Cap is the Only Suitable Response to Excessive Concentration in an Ascending Auction
 - D. The Spectrum Cap Encourages the Efficient Use of Spectrum
 - E. The Spectrum Cap Can Increase Auction Revenues by Encouraging Greater Participation Among Entrants
 - F. The Spectrum Cap Is the Best Available Policy for Achieving the Diversity Goals Set Forth in the Telecommunications Act
 - G. The Spectrum Cap Undermines the Ability of Incumbent Carriers to Warehouse Spectrum
- II. The Alleged Benefits of Removing the Spectrum Cap

- A. The Claim That Removal of the Spectrum Cap Would Alleviate the Incumbent Carriers' Capacity Constraint Is Vastly Overstated
- B. The Claim That Removal of the Spectrum Cap Would Restore the United States' Position as World Leader of the Wireless Industry Is Illusory

III. Policy Considerations

- A. The Potential Benefits of Maintaining the Spectrum Cap Outweigh the Potential Benefits of Removing It
- B. The Commission Cannot Consider the Spectrum Cap in Isolation
 - 1. The Use of Wireless Affiliates Can Circumvent the Spectrum Cap
 - 2. The Department of Justice Cannot Be Relied Upon to Prevent Any Merger that Would Reduce Potential Competition

Conclusion

I, Peter Cramton, hereby declare as follows:

QUALIFICATIONS

1. My name is Peter Cramton. I am Professor of Economics at the University of Maryland and President of Market Design Inc. I am expert on auctions, bargaining, and market exchange. Much of my recent work has applied this expertise to spectrum policy, the restructuring of infrastructure industries, and e-commerce. I previously was an Associate Professor at Yale University and a National Fellow at the Hoover Institution at Stanford University.

2. With respect to spectrum management, I have served as the lead auction adviser in over twenty spectrum auctions for many clients. My auction practice is worldwide, including engagements in the United States, Belgium, the Netherlands, Italy, the United Kingdom, Switzerland, Canada, Australia, Austria, and Singapore. I have advised several foreign governments on the design and implementation of spectrum auctions.

3. From July 1997 to August 1998, I served as the U.S. Department of Justice's expert in the matter of bid signaling in the FCC spectrum auctions. As part of this work I studied collusive bidding strategies in the FCC auctions, especially the DEF-block auction, which concluded January 1997. The analysis resulted in two research papers, as well as modification of the FCC auction rules. From November 1994 to November 1995, I advised the FCC on the design and implementation of spectrum auctions. During the first broadband PCS auction I advised the FCC on a daily basis with respect to bid increments and other aspects of auction implementation. I developed a tool to help the FCC and bidders track the progress of the auction. From July 1997 to December 1997, I advised the FCC on methods to improve the FCC auctions. In February 2000 I testified before the Senate Budget Committee on the lessons of the U.S. spectrum auction in general and the efficacy of the spectrum caps in particular.

4. I have published numerous articles in scholarly journals, including the *American Economic Review*, *Econometrica*, *Review of Economic Studies*, *Journal of Economic Literature*, *European Economic Review*, *International Economic Review*, *Journal of Regulatory Economics*, *Journal of Law and Economics*, *Journal of Labor Economics*, *Journal of Economics and Management Strategy*, *Games and Economic Behavior*, and *Journal of Law, Economics and Organization*. Over a dozen of these articles are on the economics of spectrum auctions. With respect to competition issues, I have also conducted extensive research on the formation of cartels and cartel enforcement.

5. I earned my B.S. in Engineering from Cornell University, and my Ph.D. in Business from Stanford University.

6. I submit this declaration in my capacity as President of Market Design, Inc. and not on behalf of the University of Maryland.

INTRODUCTION

7. I have been asked by Leap Wireless International, Inc. ("Leap") to examine the competitive impact of removing the Federal Communications Commission's Commercial Mobile Radio Services spectrum cap. Much of my declaration draws from my previous academic work and Senate testimony on the spectrum cap.¹ My support of the spectrum cap has not wavered.

8. A spectrum cap is a direct method of limiting the concentration of spectrum for a particular type of service in a particular area. Its advantage is that it is a bright-line test that is easy to enforce, both at the auction and in the aftermarket. In the United States, the spectrum cap has played a critical role in ensuring that there are many competitors for mobile wireless services in each market. This competition has led to clear gains for consumers in terms of lower prices and greater choices. In setting and revising spectrum caps, the Commission should err on the side of too stringent a cap. The Commission should consider the spectrum cap as a well-priced insurance policy, which guarantees the existence of a fourth competitor in each geographic market in the country.

9. Leap is the poster child illustrating the clear benefits of the spectrum cap. Removal of the cap would eliminate Leap's chances of obtaining spectrum in the secondary spectrum market, and hence would deprive consumers in *every* market not yet served by Leap of the benefits of lower prices and greater choice. Unless the Commission believes that innovative

1. Peter Cramton, *Spectrum Auctions*, HANDBOOK OF TELECOMMUNICATIONS ECONOMICS (Martin Cave, Sumit Majumdar & Ingo Vogelsand, eds. Elsevier Science 2001); Peter Cramton, Lessons for the U.S. Spectrum Auctions, Testimony before the U.S. Senate Budget Committee, Feb. 10, 2000; Peter Cramton, *The FCC Spectrum Auctions: An Early Assessment*, 6 J. ECON. & MGMT. STRATEGY 431-495 (1997).

carriers such as Leap do not bring benefits to wireless consumers, it should not feel comfortable removing the spectrum cap.

SUMMARY OF CONCLUSIONS

10. In Part I of my declaration, I describe seven potential benefits of maintaining the cap. *First*, the spectrum cap facilitates entry by innovative carriers in the mobile telephony market. In particular, I show that the entry by Leap in a local market raises consumer welfare by (1) expanding the set of choices for wireless customers, and (2) lowering the prices of local plans.

11. *Second*, by facilitating entry, the spectrum cap instills price discipline for both nationwide and local wireless services. In particular, I demonstrate that (1) the price of nationwide plans is inversely related to the number of distinct carriers offering nationwide plans, and (2) the price of local wireless plans is inversely related to the number of distinct carriers in each geographic market.

12. *Third*, the spectrum cap is the only suitable response to excessive concentration in an ascending auction. *Fourth*, the spectrum cap encourages the efficient use of spectrum. *Fifth*, contrary to basic intuition, the spectrum cap can actually increase auction revenues. *Sixth*, the spectrum cap is the best available policy for achieving the diversity goals set forth in the Telecommunications Act. *Seventh*, the spectrum cap undermines the ability of incumbent carriers to warehouse spectrum.

13. In Part II, I debunk the two purported benefits offered by those in favor of removing the cap. Spectrum cap opponents might claim that the cap limits a carrier's ability to offer data services. But wireless systems can be made sufficiently efficient that even the most

intense data services can be provided under the 45 MHz cap. Spectrum cap opponents also argue that, if U.S. carriers cannot aggregate spectrum in excess of the spectrum cap, U.S. national interests would be threatened vis-à-vis the rest of the world. Although most economists would scoff at such nationalistic arguments, I devote a (short) section to debunking that myth as well.

14. In Part III, I explain that the benefits of maintaining the cap exceed the benefits of removing it. I also explain why the Commission cannot consider the cap in isolation of other policies, such as the Commission's own policy toward the use of bidding fronts and the Department of Justice's policy toward wireless mergers.

I. THE POTENTIAL BENEFITS OF MAINTAINING THE SPECTRUM CAP

15. In this Part of my declaration, I lay out the potential benefits of maintaining the spectrum cap. I demonstrate that the gains associated with each benefit are substantial and the likelihood that each benefit will materialize is significant.

A. The Spectrum Cap Facilitates Entry by Innovative Carriers in the Mobile Telephony Market

16. A total of 180 MHz of spectrum designated for wireless services is subject to the 45/55 MHz spectrum cap—namely the 120 MHz of broadband Personal Communications Services (PCS) spectrum, 50 MHz of cellular spectrum, and 10 MHz of attributable SMR spectrum.² It is no accident that 180 MHz divided by 45 MHz maximum per carrier is four distinct carriers. Stated differently, the spectrum cap serves as an insurance policy for the Commission, which guarantees (at least) four distinct carriers in each geographic market. In this

2. See, e.g. Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, GN Dkt. No. 93-252, Third Report and Order, 9 F.C.C. Rcd. 7988, 8112-14, at ¶¶ 270-75 (1994);

section, I demonstrate that the presence in a local market of a non-traditional wireless carrier such as Leap generates significant consumer welfare benefits in terms of expanded choices and lower prices.

1. The First Leap Effect: Landline Displacement

17. The benefits from adding a non-traditional competitor such as Leap in a geographic market are greater than the benefits from adding a traditional wireless carrier. Nationwide wireless carriers that own landline networks such as Verizon and Cingular have yet to offer wireless plans that compete directly with those wireline networks.³ To do so would risk cannibalizing revenues from those wireline properties. Because non-traditional carriers such as Leap do not have rents to protect in complementary markets, their entry into a particular geographic market expands the set of choices for consumers, and thus increases consumer welfare. Moreover, Leap is appealing to a broader segment of consumers, many of whom have lower income, and cannot afford (nor value highly) some of the options that are implicit in the incumbents' wireless plans.

18. Leap's major innovation in the wireless industry is its unique flat rate, all-you-can-talk offerings. Marketed under the name Cricket, Leap offers a service that allows customers to make all their local calls from within their home service area and receive calls from anywhere for one low, flat rate.⁴ For example, Cricket charges customers in Chattanooga and Nashville \$29.95 per month to make and receive an unlimited number of local calls. The service is

1998 Biennial Regulatory Review, Spectrum Aggregation Limits for Wireless Telecommunications Carriers, WT Dkt. No. 98-205, Report and Order, 15 F.C.C. Rcd. 9219, 9223, at ¶ 6 (1999).

3. In 1999 AT&T conducted a trial for a similar plan in Plano, Texas. See Linda J. Mutschler & Paul Wuh, *The Next Generation III, Telecommunications/Cellular*, Merrill Lynch & Co., Mar. 11, 1999, at 3.

4. Information on Leap's offerings downloaded from company web site at http://www.leapwireless.com/services/content/services_cricket_2.html on Mar. 31, 2001.

designed to compete with local wireline service.⁵ Leap currently offers its innovative Cricket service in markets stretching from Salt Lake City, Utah to Charlotte, North Carolina. Leap currently owns or has rights to acquire licenses covering approximately one-quarter of the U.S. population or 72.6 million potential customers (1998 population) in 36 states. As of December 31, 2000, Leap reported more than 190,000 Cricket customers.⁶ The rapid success enjoyed by the Cricket plan demonstrates the public's thirst for its innovative offering, and the social utility derived from its existence.

19. Cricket also offers voicemail, caller ID, and call waiting for a small monthly rate. Hence, Cricket customers enjoy full mobility wherever they use their phone, and save money relative to a substitute bundle of voicemail, caller ID, call waiting, and local service from a landline operator. For example, a comparison of prices in Chattanooga, Tennessee reveals that BellSouth's residential landline package that includes unlimited local service, caller id, voicemail, and call waiting is \$7.46 more expensive than Leap's comparable bundle of local wireless service (\$44.95 versus \$37.49).⁷

20. The introduction of Leap's innovative Cricket service has induced many customers to substitute their wireline phone with their wireless phone:

- 61 percent of Leap's customers are using the wireless service as their *primary phone*, accounting for an average of 1,000 minutes of use ("MOUs") each month, while the other 39 percent are using it as a second phone line,⁸
- 7 percent of Leap's customers have *completely disconnected* their landline phone as a result of taking the Cricket service;⁹

5. *Affordable, Flat-Rate Cricket Wireless Service Launches in Nashville*, PR NEWswire, Jan. 31, 2000.

6. *Id.*

7. Information downloaded from BellSouth's web site at <http://bsol.bellsouthonline.com/cgi-bin/gx.cgi/AppLogic+ProductPageAppLogic?applDomain=conscatalog&appName=consumer&location=423855&pc=APWCC>.

8. *Wireless Is Having Relatively Small Impact on First Wired Telephone Lines*, COMMUNICATIONS DAILY, Mar. 1, 2000, at 6.

- Nearly half of Leap's customers take Cricket either as a complete replacement of landline service or as a replacement for a second or third line to the home;¹⁰
- 86 percent of Leap's customers use their Cricket phone at home compared to 35 percent for traditional wireless;¹¹
- 53 percent of Leap's customers report that they have displaced a significant portion of their landline usage with Cricket compared to 6 percent for traditional wireless;¹²
- 70 percent of Leap's customers are either completely new to wireless or coming back to wireless after a long-term disconnect (defined as greater than 3 months);¹³
- 58 percent of Leap's customers in Tulsa report that they use Cricket as their primary phone;¹⁴
- 60 percent of Leap's customers in Salt Lake City report that they use Cricket as their primary phone;¹⁵

The high degree of substitution from wireline to wireless in Leap's markets reveals that consumers have benefited tremendously from the introduction of those plans.

21. The Commission itself has recognized "wireless/wireline competition" as "a major operational trend" in both the *Fourth Report*¹⁶ and *Fifth Report*¹⁷ on the state of wireless competition:

In the past year, mobile telephone carriers, and most often broadband PCS operators, have begun to use a variety of methods to target homes with wireline-based second telephone lines. This strategy is especially prevalent among broadband PCS operators with licenses in rural or smaller urban areas. . . . Because the digital technology used by broadband PCS systems can replicate

9. Internal Leap estimate.

10. *Id.*

11. YANKEE GROUP, 1999 MOBILE USER SURVEY (released February 2000).

12. *Id.*

13. Internal Leap estimate.

14. LEAP WIRELESS, TULSA CUSTOMER SATISFACTION SURVEY 2000 (sample size of 300 customers).

15. LEAP WIRELESS, SALT LAKE CITY CUSTOMER SATISFACTION SURVEY 2000 (sample size of 300 customers).

16. Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Fourth Report (released June 24, 1999), at 12 [hereinafter *FOURTH REPORT*].

17. Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, Fifth Report (released Aug. 18, 2000), at 14 [hereinafter *FIFTH REPORT*].

many of the features of wireline phones and analog cellular networks cannot, many broadband PCS operators in these areas are promoting their services as replacements for second telephone lines in homes or businesses.¹⁸

The innovative services offered by Leap not only represent “wireless attacking the second line,”¹⁹ as the Commission recently coined the phenomenon, but wireless attacking the first line as well.

2. The Second Leap Effect: Lower Prices in Local Service Plans

22. The second benefit to consumers in markets where Leap has entered (“Leap markets”) is lower prices for local service plans. In particular, I have calculated the decline in local prices in several Leap markets. Table 1 shows the Leap markets and the date on which Leap began offering wireless service (“launch date”).

TABLE 1: LAUNCH DATES FOR LEAP MARKETS

Number	Market	Launch Date	Top 100 MSA
1	Chattanooga, TN	6/1/99	Yes
2	Nashville, TN	1/31/00	Yes
3	Knoxville, TN	10/25/00	Yes
4	Memphis, TN	11/15/00	Yes
5	Greensboro, NC	11/29/00	Yes
6	Columbia (Nashville Expansion)	11/30/00	No
7	Clarksville, TN	11/30/00	No
8	Tulsa, OK	11/30/00	Yes
9	Tucson, AZ	12/7/00	Yes
10	Charlotte, NC	12/8/00	Yes
11	Little Rock, AR	12/13/00	Yes
12	Hot Springs, AR	12/13/00	No
13	Salt Lake City/Ogden, UT	12/14/00	Yes
14	Provo, UT	12/14/00	No
15	Albuquerque, NM	2/14/01	Yes
16	Santa Fe, NM	2/14/01	No
17	Wichita, KS	2/28/01	Yes

Source: Leap Wireless internal data.

As the shaded portion of Table 1 shows, Leap entered 14 markets between June 1999 and December 2000.

18. FOURTH REPORT, *supra* note 16, at 12.